

# CURRICULUM VITAE

## PAVEL DEMINE

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**Born:** July 21, 1976 in Moscow, Russia.

**Marital Status:** Single.

**Citizenship:** Russian, French Resident Alien.

### Education:

*Postgraduate* Nov. 2002. **Joseph Fourier University**, Grenoble, France.  
Ph.D. in Physics.

*Undergraduate* Dec. 1998. **Moscow State Engineering Physics Institute**, Moscow, Russia.  
Graduated with Honours Diploma in Nuclear Physics/Particle Physics.

### Professional Experience:

01/03 - 06/04 **Postdoc**, CEA - DAPNIA - Service de physique des particules, Saclay, France.  
Contact: Dr. Christophe Royon.

- jet triggers efficiencies analysis
- selection of data for QCD and Jet Energy Scale groups
- measurement of the dijet mass spectrum at DØ  
and extension of the analysis to high rapidity
- study of diffractive production of Higgs boson

10/99 - 11/02 **Graduate student**, Joseph Fourier University, Grenoble, France.

Thesis Title: Study of the tri-lepton events in the Run II data of the DØ experiment at the Tevatron (FNAL, USA). Interpretation in the R-parity violating supersymmetry framework (lambda coupling).

Thesis Advisor: Professor Gerard Sajot.

- search for supersymmetric particles
- electron identification at DØ
- heavy flavor jets identification at DØ

- 01/99 - 06/99      **Visitor**, Institut des Sciences Nucléaires, Grenoble, France.  
Advisor: Professor Gerard Sajot.
- 09/97 - 12/98      **Undergraduate student**, Moscow State Engineering Physics Institute (Technical University), Moscow, Russia.  
Thesis Title: Fractal and 4-dimensional characteristics of the inelastic pion-proton interactions at initial momentum 3.9 GeV/c.  
Thesis Advisor: Professor Felix M. Sergeev.

### Teaching Experience:

- 09/96 - 05/97      Two semesters C++ Programming Language, Centre for Youth Science and Technology, Moscow, Russia.

### International Schools:

- 08/01 - 09/01      European School of High-Energy Physics, Beatenberg, Switzerland.

### Presentations at Workshops:

#### *Dijet Mass Spectrum Analysis at DØ*

- 16 Jun. 2003      Workshop DØ 2003, Beaune, France.

#### *Search for R-parity Violating Supersymmetry at DØ*

- 23 Apr. 2002      APS Meeting, Albuquerque, New Mexico, USA.  
14 Dec. 2001      DØ New Phenomena Workshop, FNAL.  
29 Nov. 2001      DØ-France Group Meeting, Strasbourg, France.

#### *Heavy Flavor Identification at DØ*

- 20 Dec. 2001      DØ Muon Id Workshop, CEA, Saclay, France.  
30 Nov. 2001      DØ-France Group Meeting, Strasbourg, France.  
25 Jan. 2001      DØ-France Group Meeting, Marseille, France.

### Presentations at Conferences:

- Recent QCD results from the CDF and DØ experiments at the Tevatron, P. Demine (for the DØ collaboration), published in the proceedings of “XXXIII International Symposium on Multiparticle Dynamics”, Acta Physica Polonica B 35 101 (2004)
- Recent Results From the DØ Experiment at the Tevatron, P. Demine (for the DØ collaboration), published in the proceedings of “New Trends in HEP 2003”, Ukrainian Journal of Physics 48 1158 (2003)
- The fractal Hurst's law in pion-proton interactions at initial momentum 3.9 GeV/c, V. S. Demidov, P. A. Demine, V. I. Mikhailichenko, V. A. Okorokov, A. K. Ponomov, F. M. Sergeev, published in the proceedings of “Workshop MEPhI-99”, January 18-22, part 4, 168-169 (1999)
- The relativistic-invariant analysis of the forming of the pion jets in the inelastic pion-proton interactions at initial momentum 3.9 GeV/c, P. A. Demine, V. I. Mikhailichenko, V. A. Okorokov, A. K. Ponomov, F. M. Sergeev, published in the proceedings of “Workshop MEPhI-99”, January 18-22, part 4, 170-171 (1999)

## Current Research Activities:

Currently, I am participating in the DØ collaboration as a postdoc at CEA Saclay. In the following, the topics on which I am working are briefly summarised.

### *Measurement of dijet mass spectrum at DØ*

A part of my work is devoted to the measurement of dijet production cross section using the DØ experiment Run II data. This measurement is important since it is sensitive at high dijet mass to the effects beyond the Standard Model (quark compositeness, high mass resonances, etc.). This work consists of

- selection of the data useful for all the analyses of the DØ QCD group and for the jet energy scale measurement;
- development of a program necessary to represent the information related to all analyses of the DØ QCD and “Jet Energy Scale” groups in the format suitable for analysis with ROOT numerical analysis program;
- regular control of the data quality and of the jet triggers performance;
- measurement of the dijet production cross section in the DØ Run II data and extension of this analysis to the high rapidity jets.

The results of this work were the subject of an internal DØ note and were presented at the conferences held in 2003. A publication of the results on the jets cross section measurement is planned for the summer 2004.

### *Diffraction production of supersymmetric Higgs bosons*

The discovery of the Higgs boson is one of the main goals of searches at the present and next hadronic colliders, the Tevatron and the LHC. The few Higgs boson candidates found at the end of LEP 2 motivate this search in the mass region between 115 and 120 GeV, especially at the Tevatron. Since the region of low mass of the Higgs boson is quite difficult to explore both at the Tevatron and at the LHC, it is very important to find different ways to search for Higgs boson in this mass region. The diffractive processes are of particular interest because of the excellent Higgs boson mass resolution that they could provide. The supersymmetric models predict the Higgs bosons with low mass and such models are also of particular interest.

The theoretical part of my work has been carried out in collaboration with the Theoretical Physics Service at CEA Saclay in order to develop the phenomenology of the diffractive production of the Higgs bosons in the supersymmetric framework. This work consists in implementing the calculations of the diffractive production cross section of the Higgs bosons in the supersymmetric framework into the MC generator developed at CEA Saclay and in finding the regions of the supersymmetric models' parameters interesting to explore at the LHC and at the Tevatron.

The experimental part will include the analysis of the data accumulated by the DØ experiment.

I am actively participating in the preparation of the publication presenting our results. I will present the results of this work at the “Moriond 2004” conference.

## Ph.D. thesis work:

During my Ph.D. thesis work I was a member of the DØ group of Institut des Sciences Nucléaires (Grenoble, France). My primary research interests concentrated on searches for new particles not described by our current Standard Model. I have carried out these studies at the Tevatron the highest energy proton-antiproton collider in the world. In the following, I briefly summarise the topics on which I was working.

### *DØ Supersymmetry Searches*

Supersymmetry (SUSY) is one of the leading candidates for new physics beyond the Standard Model (SM). I was concentrating on search of Supersymmetry (SUSY) through R-parity violation. Standard search for SUSY assumes R-parity conservation. SM particles have  $R=+1$  and SUSY particles have  $R=-1$ . Result of this assumption is the stability of the lightest SUSY particle (LSP). In case R-parity is not conserved the LSP is not stable. Violation of R-parity through Lepton number leads to the LSP decay into three leptons ( $\lambda$  couplings) or into one lepton and two quarks ( $\lambda'$  couplings). Decay of the LSP through Baryon number violation leads to the pure hadronic final states that are very difficult to separate from the QCD background. My work was mainly concentrated on the case of the  $\lambda$  coupling and represents an inclusive analysis of multilepton final state. The preliminary results of my work have been presented at the New Phenomena Working Group regular meetings (convenors: L. Duflot & G. Landsberg) and at summer 2002 conferences.

### *Heavy flavor identification at DØ*

I participated in Heavy Flavor Identification Working Group (convenors: R. J. Van Kooten & F. Filthaut). My primary responsibility in this group was development of an algorithm capable to combine information about main properties of heavy flavour jets into a single discriminating variable used to identify them. I have adapted the likelihood ratio method successfully used at the electron-positron colliders experiments (Delphi, SLD etc.).

I was also responsible for providing a program necessary to represent the information related to heavy flavour jets identification in the format suitable for analysis with ROOT numerical analysis program.

The results of my work was reported during the Heavy Flavor Identification Working Group regular meetings. Both programs are implemented into the DØ full reconstruction program and they are used by the DØ collaboration.

### *Electron identification at DØ*

The Grenoble group is involved in electron identification at the DØ detector. In this group I accepted responsibility for providing a C++ program which constructs a discriminator for the electron identification. The algorithm is based on the maximum likelihood method and combines different characteristics of the electromagnetic shower in the calorimeter.

The presentations of this work was done in France during the meetings of the group DØ-France and at Fermilab during the Electron Identification Working Group meetings. The final version of the likelihood algorithm is implemented into the DØ full reconstruction program.

### **Foreign Languages:**

<i>Russian</i>	native language
<i>French</i>	written and spoken fluently
<i>English</i>	written and spoken fluently